WE CLAIM:

1. A branched alcohol composition comprising a branched ether primary alcohol represented by the formula:

$$\mathtt{CH}_{\overline{3}} \hspace{-0.1cm} \stackrel{R_1}{\overset{R_1}{\overset{}{\overset{}{\overset{}{\overset{}{\overset{}{\overset{}}{\overset{}{\overset{}{\overset{}}$$

wherein R_1 represents hydrogen or a hydrocarbyl radical having from 1 to 3 carbon atoms, R_2 represents a hydrocarbyl radical having from 1 to 7 carbon atoms, x is a number ranging from 0 to 16, wherein the total number of carbon atoms in the alcohol ranges from 9 to 24.

- 2. The branched alcohol composition of claim 1 wherein R_2 is a hydrocarbyl radical having 1 carbon atom.
- 3. The branched alcohol composition of claim 2 wherein R_1 is hydrogen.
- 4. The branched alcohol composition of claim 1 wherein x is a number ranging from 3 to 13.
- 5. An alkyl ether sulfate composition comprising an alkyl ether sulfate represented by the formula:

 $\rm XOSO_3M$, wherein M is hydrogen or a cation, and X is represented by the formula

$$\mathtt{CH}_{\overline{3}} \hspace{-0.1cm} \xrightarrow{ \begin{pmatrix} \mathtt{R}_1 \\ \mathtt{CH} \end{pmatrix}_{\mathbf{x}}} \hspace{-0.1cm} \xrightarrow{ \mathtt{R}_2 \\ \mathtt{CH} \longrightarrow \mathtt{O}} \hspace{-0.1cm} - \mathtt{CH}_{\overline{2}} \hspace{-0.1cm} \longrightarrow \hspace{-0.1cm} \mathtt{CH}_{\overline{2}} \hspace{-0.$$

wherein R_1 represents hydrogen or a hydrocarbyl radical having from 1 to 3 carbon atoms, R_2 represents a hydrocarbyl radical having from 1 to 7 carbon atoms, x is a number ranging from 0 to 16, wherein the total number of carbon atoms in the alkyl ether sulfate ranges from 9 to 24.

- 6. The alkyl ether sulfate composition of claim 5 wherein M is hydrogen.
- 7. The alkyl ether sulfate composition of claim 5 wherein M is a cation effective to provide a water soluble alkyl ether sulfate composition.
- 8. The alkyl ether sulfate composition of claim 7 wherein M is selected from the group consisting of ammonium, alkanolammonium, monovalent metal cations, and polyvalent metal cations.
- 9. The alkyl ether sulfate composition of claim $\frac{5}{2}$ wherein R_2 is a hydrocarbyl radical having 1 carbon atom.
- 10. The alkyl ether sulfate composition of claim $\frac{9}{2}$ wherein R_1 is hydrogen.
- 11. The alkyl ether sulfate composition of claim 5 wherein x is a number ranging from 3 to 13.
- 12. The alkyl ether sulfate composition of claim 6 wherein R_2 is a hydrocarbyl radical having 1 carbon atom.
- 13. The alkyl ether sulfate composition of claim 12 wherein R_1 is hydrogen.

14. The alkyl ether sulfate composition of claim 6 wherein x is a number ranging from 3 to 13.

- 15. The alkyl ether sulfate composition of claim $\frac{7}{2}$ wherein R_2 is a hydrocarbyl radical having 1 carbon atom.
- 16. The alkyl ether sulfate composition of claim 15 wherein R_1 is hydrogen.
- 17. The alkyl ether sulfate composition of claim 7 wherein x is a number ranging from 3 to 13.
- 18. An alcohol alkoxysulfate composition comprising an alcohol alkoxy sulfate represented by the formula:

$$CH_{\overline{3}} \hspace{-0.1cm} - \hspace{-0.1cm} \begin{pmatrix} R_1 \\ CH \\ \hspace{-0.1cm} - \hspace{-0.1cm} \\ \hspace{-0.1cm} CH \\ \hspace{-0.1cm} - \hspace{-0.1cm} CH_{\overline{2}} \hspace{-0.1cm$$

wherein R_1 represents hydrogen or a hydrocarbyl radical having from 1 to 3 carbon atoms, R_2 represents a hydrocarbyl radical having from 1 to 7 carbon atoms, x is a number ranging from 0 to 16, A is an alkylene radical having carbon number in the range of 2 to 4, y is a number ranging from 1 to 9, wherein the total number of carbon atoms in the alcohol alkoxysulfate excluding A ranges from 9 to 24, and M is hydrogen or a cation.

19. The alcohol alkoxysulfate composition of claim $\frac{18}{18}$ wherein A is an alkylene radical having carbon number in the range of 2 to 3.

- 20. The alcohol alkoxysulfate composition of claim 19 wherein A is an alkylene radical having carbon number of 2.
- 21. The alkyl ether sulfate composition of claim 18 wherein M is hydrogen.
- 22. The alkyl ether sulfate composition of claim 18 wherein M is a cation effective to provide a water soluble alkyl ether sulfate composition.
- 23. The alkyl ether sulfate composition of claim 22-wherein M is selected from the group consisting of ammonium, alkanolammonium, monovalent metal cations, and polyvalent metal cations.
- 24. The alkyl ether sulfate composition of claim 18 wherein R_2 is a hydrocarbyl radical having 1 carbon atom.
- 25. The alkyl ether sulfate composition of claim $\underline{24}$ wherein R_1 is hydrogen.
- 26. The alkyl ether sulfate composition of claim 18—wherein x is a number ranging from 3 to 13.
- 27. The alkyl ether sulfate composition of claim 20 wherein R_2 is a hydrocarbyl radical having 1 carbon atom.
- 28. The alkyl ether sulfate composition of claim 27 wherein R_1 is hydrogen.
- 29. The alkyl ether sulfate composition of claim 20 wherein x is a number ranging from 3 to 13.

30. A branched alkanol alkoxylate composition comprising an alkanol alkoxylate represented by the formula:

$$CH_{3} \hspace{-0.1cm} \stackrel{\textstyle R_1}{\stackrel{\textstyle C}{\stackrel{}{\stackrel{}}{\stackrel{}}{\stackrel{}}{\stackrel{}}}} \stackrel{\textstyle R_2}{\stackrel{\textstyle C}{\stackrel{}{\stackrel{}}{\stackrel{}}{\stackrel{}}}} CH_{2} \hspace{-0.1cm} - \hspace{-0.1cm} CH_{\overline{2}} \hspace{-0.1cm} - \hspace{-0.1cm}$$

wherein R_1 represents hydrogen or a hydrocarbyl radical having from 1 to 3 carbon atoms, R_2 represents a hydrocarbyl radical having from 1 to 7 carbon atoms, x is a number ranging from 0 to 16, A is an alkylene radical having carbon number in the range of 2 to 4, y is a number ranging from 1 to 9, wherein the total number of carbon atoms in the alkanol alkoxylate excluding A ranges from 9 to 24.

- 31. The branched alkanol alkoxylate composition of claim 30 wherein A is an alkylene radical having carbon number in the range of 2 to 3.
- 32. The branched alkanol alkoxylate composition of claim 31 wherein A is an alkylene radical having carbon number of 2.
- 33. The branched alkanol alkoxylate composition of claim 30 wherein R_2 is a hydrocarbyl radical having 1 carbon atom.
- 34. The branched alkanol alkoxylate composition of claim 33 wherein R_1 is hydrogen.
- 35. The branched alkanol alkoxylate composition of claim 30 wherein x is a number ranging from 3 to 13.

60

- 36. The branched alkanol alkoxylate composition of claim 32 wherein R_2 is a hydrocarbyl radical having 1 carbon atom.
- 37. The branched alkanol alkoxylate composition of claim 36 wherein R_1 is hydrogen.
- 38. The branched alkanol alkoxylate composition of claim 32 wherein x is a number ranging from 3 to 13.
- 39. A detergent composition comprising the alkyl ether sulfate composition of claim 5.
- 40. A detergent composition comprising the alkyl ether sulfate composition of claim 6.
- 41. A detergent composition comprising the alkyl ether sulfate composition of claim 7.
- 40. A detergent composition comprising the alkyl ether sulfate composition of claim 9.
- 41. A detergent composition comprising the alkyl ether sulfate composition of claim 11.
- 42. A detergent composition comprising the alcohol ethoxysulfate composition of claim 18.
- 43. A detergent composition comprising the alcohol ethoxysulfate composition of claim 20.
- 44. A detergent composition comprising the alcohol ethoxysulfate composition of claim 22.

- 45. A detergent composition comprising the alcohol ethoxysulfate composition of claim 24.
- 46. A detergent composition comprising the alcohol ethoxysulfate composition of claim 26.
- 47. A detergent composition comprising the alkanol alkoxylate composition of claim 30.
- 48. A detergent composition comprising the alkanol alkoxylate composition of claim 32.
- 49. A detergent composition comprising the alkanol alkoxylate composition of claim 33.
- 50. A process to produce a branched alcohol composition comprising:

contacting an olefin having an average carbon number in the range of 3 to 18 with 1,3-propane diol in the presence of a catalyst effective to react the olefin with the diol under conditions effective to produce the branched alcohol composition.

- 51. The process of claim 50 wherein the catalyst is an acid catalyst.
- 52. The process of claim 51 wherein the average carbon number of the olefin is in the range of 6 to 18.
- 53. The process of claim 51 wherein the diol and olefin is contacted at a temperature within the range of from 50 °C to 250°C.

- 54. A process to produce a branched alkyl ether sulfate composition comprising:
- a) contacting an olefin having an average carbon number in the range of 3 to 18 with 1,3-propane diol in the presence of a catalyst effective to react the olefin with the diol thereby producing a branched alcohol composition; and
- b) contacting the branched alcohol composition with a sulfating agent under conditions effective to produce a branched alkyl ether sulfate composition.